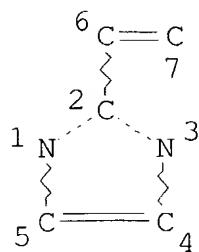


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FILE 'REGISTRY' ENTERED AT 14:58:21 ON 02 JUL 2004
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=> d his

FILE 'BEILSTEIN' ENTERED AT 14:41:39 ON 02 JUL 2004
L1 STR
FILE 'REGISTRY' ENTERED AT 14:43:33 ON 02 JUL 2004
L2 SCR 2043
L3 8 S L1
L4 1 S L1 AND L2
L5 STR L1
L6 3 S L5 AND L2
FILE 'HCAPLUS' ENTERED AT 14:46:24 ON 02 JUL 2004
L7 94 S WIXOM ?/AU
L8 8069 S LEI ?/AU
L9 225070 S ZHANG ?/AU
L10 1 S L7 AND L8 AND L9
SEL L10 1 RN
FILE 'REGISTRY' ENTERED AT 14:46:49 ON 02 JUL 2004
L11 16 S E1-E16
L12 0 S L11 AND PMS/CI
L13 522 S L1 FUL
SAV L13 WEI582/A
L14 43 S L13 AND PMS/CI
FILE 'HCA' ENTERED AT 14:53:15 ON 02 JUL 2004
L15 30 S L14
L16 234 S L13
L17 4325 S PEM OR PEMS OR (PROTON? OR H OR HYDROGEN#) (3A) EXCHANG? ((3A)
L18 42280 S FUEL? (2A) (CELL OR CELLS) OR FUELCELL?
L19 0 S L15 AND (L17 OR L18)
L20 1 S L16 AND (L17 OR L18)
L21 16 S L13/D OR L13/DP
L22 1 S L21 AND (L17 OR L18)
L23 1 S L20 OR L22
L24 42 S (L15 OR L21) NOT L23
FILE 'REGISTRY' ENTERED AT 14:58:21 ON 02 JUL 2004

=> d 113 que stat
L1 STR



NODE ATTRIBUTES:

DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:

RSPEC I

NUMBER OF NODES IS 7

STEREO ATTRIBUTES: NONE

L13 522 SEA FILE=REGISTRY SSS FUL L1

100.0% PROCESSED 64788 ITERATIONS
SEARCH TIME: 00.00.01

522 ANSWERS

=> file hca

FILE 'HCA' ENTERED AT 14:58:31 ON 02 JUL 2004

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=> d 123 1 all hitstr

L23 ANSWER 1 OF 1 HCA COPYRIGHT 2004 ACS on STN

AN 141:26109 HCA

ED Entered STN: 01 JUN 2004

TI Proton exchange membrane for
fuel cell

IN ~~Fuel cell~~ Wixom, Michael; Lei, Hanwei; Zhang, Pu; Ma, Junging

IN WIZA
PA USA

PA USA
SO U.S. Pat. Appl. Publ. 7 pp

50 U.S. Pat. App.
CUDEN: USXXCO

DT Patents

LA English

IC ICM H01M008-10

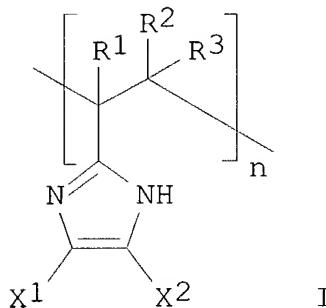
NCL 429033000

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 38

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 2004106030	A1	20040603	US 2003-719582	20031121
	WO 2004049469	A2	20040610	WO 2003-US37521	20031124
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD RW: BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
PRAI	US 2002-428542P	P	20021122		
	US 2003-719582	A	20031121		

GI



AB A proton exchange membrane for a fuel cell is prep'd. from a polyimidazole polymer having the formula (I) wherein R1-R3 are independently H, a halogen, an alkyl or a substituted alkyl; X1 and X2 are independently or an electron withdrawing group such as CN. The membrane may be doped to alter its cond. The membrane may be prep'd. from a copolymer of the polyimidazole. Also disclosed is a fuel cell incorporating the membrane.

ST fuel cell proton exchange membrane vinylimidazole polymer

IT Polyphosphoric acids
(dopant; **proton exchange membrane**
for **fuel cell**)

IT Acids, uses
(inorg., dopant; **proton exchange**
membrane for fuel cell)

IT Electric conductivity
(**proton exchange membrane** for
fuel cell)

IT Heteropoly acids
(**proton exchange membrane** for
fuel cell)

IT **Fuel cells**
(solid electrolyte; **proton exchange**
membrane for **fuel cell**)

IT 7664-38-2, Phosphoric acid, uses 7664-93-9, Sulfuric acid, uses
7697-37-2, Nitric acid, uses
(dopant; **proton exchange membrane**
for **fuel cell**)

IT 67-68-5, Dmso, uses 68-12-2, Dmf, uses 872-50-4,
N-Methylpyrrolidone, uses
(polar solvent; **proton exchange**
membrane for **fuel cell**)

IT 1184-84-5D, Vinylsulfonic acid, polymers with vinylimidazole derivs.
1746-03-8D, Vinylphosphonic acid, polymers with vinylimidazole
derivs. 7440-21-3D, Silicon, compd. 26914-43-2D, Styrenesulfonic
acid, polymers with vinylimidazole derivs. 43129-93-7D,
2-Vinylimidazole, derivs., polymers with vinyl group-contg. acids
(**proton exchange membrane** for
fuel cell)

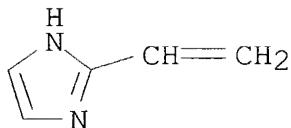
IT 1343-93-7, Phosphotungstic acid 2627-35-2, Monododecylphosphate
12026-57-2, Phosphomolybdic acid 12027-38-2, Silicotungstic acid
(**proton exchange membrane** for
fuel cell)

IT 7631-86-9, Silica, uses
(**proton exchange membrane** for
fuel cell)

IT 43129-93-7D, 2-Vinylimidazole, derivs., polymers with vinyl
group-contg. acids
(**proton exchange membrane** for
fuel cell)

RN 43129-93-7 HCA

CN 1H-Imidazole, 2-ethenyl- (9CI) (CA INDEX NAME)



=> d 124 1-42 ti

L24 ANSWER 1 OF 42 HCA COPYRIGHT 2004 ACS on STN

TI Fabrication of encapsulated granulates for subterranean well treatment fluids with delayed release by compaction and dry comminution

L24 ANSWER 2 OF 42 HCA COPYRIGHT 2004 ACS on STN

TI Near edge X-ray absorption fine structure characterization of polymers based on 2-vinyl-4,5-dicyanoimidazole

L24 ANSWER 3 OF 42 HCA COPYRIGHT 2004 ACS on STN

TI Oxidative hair dyes containing dicyanmethylen indane derivatives, other dyes and color intensifiers

L24 ANSWER 4 OF 42 HCA COPYRIGHT 2004 ACS on STN

TI Hair dyes containing aromatic or heteroaromatic aldehydes and ketones in combination with other dyes and color intensifiers

L24 ANSWER 5 OF 42 HCA COPYRIGHT 2004 ACS on STN

TI Oxidative hair dyes containing quaternary heterocycles

L24 ANSWER 6 OF 42 HCA COPYRIGHT 2004 ACS on STN

TI Hair dyes containing aromatic or heteroaromatic aldehydes and ketones in combination with 1-acylindoline-3-one derivatives, other dyes and color intensifiers

L24 ANSWER 7 OF 42 HCA COPYRIGHT 2004 ACS on STN

TI Temperature-sensitive hairy particles

L24 ANSWER 8 OF 42 HCA COPYRIGHT 2004 ACS on STN

TI The monomer and polymer chemistry of 4,5-dicyano-2-vinylimidazoles

L24 ANSWER 9 OF 42 HCA COPYRIGHT 2004 ACS on STN

TI Hydrogen bonding in cyanoimidazole monomers and polymers

L24 ANSWER 10 OF 42 HCA COPYRIGHT 2004 ACS on STN

TI Preparation of copolymers of vinyl dicyanoimidazoles and their use as coupling agent for oligonucleotides

L24 ANSWER 11 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Hair dye compositions containing aromatic aldehydes or ketones

L24 ANSWER 12 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Method using a RXR-selective retinoid for preventing onset of restenosis after angioplasty

L24 ANSWER 13 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI An improved synthesis of 2-vinyl-4,5-dicyanoimidazole and characterization of its polymers

L24 ANSWER 14 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Synthesis, polymerization and kinetic studies of the new monomer, 4,5-dicyano-2-vinylimidazole

L24 ANSWER 15 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Compounds and polymers formed from imidazoles

L24 ANSWER 16 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Oxygen-permeable polymer membranes

L24 ANSWER 17 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Manufacture of anion exchanger resins bearing quaternary ammonium groups

L24 ANSWER 18 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Silver halide photographic material containing polymer with photographically useful group rendering nondiffusive by crosslinking

L24 ANSWER 19 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Photographic element using polymer mordant

L24 ANSWER 20 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Water-soluble copolymers comprising an ampholytic imidazolium inner salt and their use as fluid loss control agents and viscosifiers in well treating fluids, especially for high-temperature reservoirs.

L24 ANSWER 21 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Graft polymers as impact modifiers for plastic molding compositions

L24 ANSWER 22 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Impact-modified thermoplastic molding compositions

L24 ANSWER 23 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Acrylate copolymers containing amino, carboxyl and, optionally, hydroxy groups

L24 ANSWER 24 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Yellowing-resistant plastisols for use under topcoats

L24 ANSWER 25 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Electrically conductive pastes and electrically conductive coatings with lasting conductivity

L24 ANSWER 26 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Corrosion inhibitors for amine-crosslinked vinyl polymex coatings

L24 ANSWER 27 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Mechanisms of loading of metal cyanides on weak-base resins

L24 ANSWER 28 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Selective permeable ethylene-vinyl alcohol copolymer packaging films

L24 ANSWER 29 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Synthesis of novel, water-soluble cyclic amidine polymers. II. 2-Vinylimidazole systems

L24 ANSWER 30 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Sludge dewatering agents

L24 ANSWER 31 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Dehydration of aqueous suspensions of fine granules

L24 ANSWER 32 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Combined use of aqueous and nonaqueous polarography for vinyl monomer determination in copolymers

L24 ANSWER 33 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Homopolymers and copolymers of 2-alkenylimidazole or its 1,3-dialkyl-2-alkenylimidazolium salts

L24 ANSWER 34 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Polyisocyanate-containing adhesive

L24 ANSWER 35 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Colloidal iron dispersions by the polymer-catalyzed decomposition of iron carbonyl and iron organocarbonyl compounds

L24 ANSWER 36 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Colloidal cobalt dispersions by the polymer-catalyzed decomposition of cobalt carbonyl and cobalt organocarbonyl compounds

L24 ANSWER 37 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI The relation between kinetic parameter and catalytic activity of imidazole-containing polymer catalyst

L24 ANSWER 38 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Lubricating oil additive

L24 ANSWER 39 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Chemotherapeutic agent against infections by trypanosomes and entamoeba

L24 ANSWER 40 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Porous polymers

L24 ANSWER 41 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI The mechanism of the stereoregular polymerization of 2-vinylimidazole and 2-vinylbenzimidazole

L24 ANSWER 42 OF 42 HCA COPYRIGHT 2004 ACS on STN
TI Synthesis and polymerization of 2-vinylimidazole and 2-vinylbenzimidazole

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AND TECHNOLOG
Y CORPORATION, AND FACHINFORMATIONSZENTRUM KARLSRUHE

FILE CONTAINS CURRENT INFORMATION.
LAST RELOADED: Jun 25, 2004 (20040625/UP).

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This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d 124 9,16,17 cbib abs hitstr hitind

L24 ANSWER 9 OF 42 HCA COPYRIGHT 2004 ACS on STN

135:358456 Hydrogen bonding in cyanoimidazole monomers and polymers.
 Densmore, Crystal G.; Meyer, Jeffrey G.; DeHaan, Nick; Rasmussen, Paul G.; Raptis, Raphael; Baran, Peter (Dept. of Chemistry & Macromolecular Science & Engineering Ctr., University of Michigan, Ann Arbor, MI, 48109-1055, USA). Polymer Preprints (American Chemical Society, Division of Polymer Chemistry), 42(2), 236-237 (English) 2001. CODEN: ACPPAY. ISSN: 0032-3934. Publisher: American Chemical Society, Division of Polymer Chemistry.

AB The results of the vibrational studies of hydrogen bonding in the unusually acidic cyanoimidazoles, using both model compds. and new polymers are discussed briefly to elucidate the spectroscopic and structural effects in this class of materials.

IT 247089-33-4, 4,5-Dicyano-2-vinylimidazole homopolymer
 (hydrogen bonding in cyanoimidazole monomers and polymers)

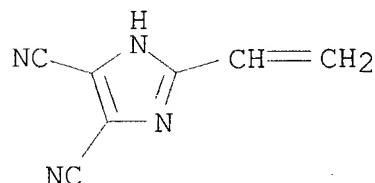
RN 247089-33-4 HCA

CN 1H-Imidazole-4,5-dicarbonitrile, 2-ethenyl-, homopolymer (9CI) (CA INDEX NAME)

CM 1

CRN 55083-86-8

CMF C7 H4 N4



CC 36-6 (Physical Properties of Synthetic High Polymers)

Section cross-reference(s): 35

IT 55083-86-8, 4,5-Dicyano-2-vinylimidazole 247089-33-4,
 4,5-Dicyano-2-vinylimidazole homopolymer

(hydrogen bonding in cyanoimidazole monomers and polymers)

L24 ANSWER 16 OF 42 HCA COPYRIGHT 2004 ACS on STN

131:229881 Oxygen-permeable polymer membranes. Tsuchida, Hidetoshi;

Nishiide, Hiroyuki (Foundation for Scientific Technology Promotion, Japan). Jpn. Kokai Tokkyo Koho JP 11262643 A2 19990928 Heisei, 6 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1998-70652 19980319.

AB The membranes, useful for manuf. of O-enriched air for industrial and medical uses, are composed of ≥ 2 arom. vinylamine polymers and meso-tetrakis($\alpha, \alpha, \alpha, \alpha$ -o-pivalamidophenyl)porphyrinatocobalt (I). Thus, a 60 μm -thick 3-layer membrane consisting of poly(1-vinylimidazole-co-octyl methacrylate)-I complex, poly(4-vinylpyridine-co-octyl methacrylate)-I complex, and poly(2-vinylpyridine-co-octyl methacrylate)-I complex showed O permeability coeff. 2.4 + 10-8 cm^3 (STP). $\text{cm}/\text{cm}^2\text{-s-cmHg}$ and O/N permselectivity 72.

IT 243969-69-9DP, tetrakis(pivalamidophenyl)porphyrinatocobalt complexes (O-permeable membranes contg. arom. vinylamine polymer-tetrakis(pivalamidophenyl)porphyrinatocobalt complexes for prodn. of O-enriched air)

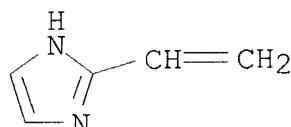
RN 243969-69-9 HCA

CN 2-Propenoic acid, 2-methyl-, octyl ester, polymer with 2-ethenyl-1H-imidazole (9CI) (CA INDEX NAME)

CM 1

CRN 43129-93-7

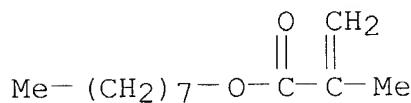
CMF C5 H6 N2



CM 2

CRN 2157-01-9

CMF C12 H22 O2



IC ICM B01D071-60
 ICS B01D053-22; B01D071-28; B01D071-82; C01B013-02
 CC 38-3 (Plastics Fabrication and Uses)
 Section cross-reference(s): 48, 63

IT 36657-72-4DP, Lauryl methacrylate-2-vinylpyridine copolymer, tetrakis(pivalamidophenyl)porphyrinatocobalt complexes
 67882-01-3DP, Lauryl methacrylate-4-vinylpyridine copolymer, tetrakis(pivalamidophenyl)porphyrinatocobalt complexes
 87680-76-0DP, arom. vinylamine polymer complexes 98086-55-6DP, Lauryl methacrylate-1-vinylimidazole copolymer, tetrakis(pivalamidophenyl)porphyrinatocobalt complexes
 100829-32-1DP, Octyl methacrylate-4-vinylpyridine copolymer, tetrakis(pivalamidophenyl)porphyrinatocobalt complexes
 148231-09-8DP, Octyl methacrylate-1-vinylimidazole copolymer, tetrakis(pivalamidophenyl)porphyrinatocobalt complexes
 243969-68-8DP, tetrakis(pivalamidophenyl)porphyrinatocobalt complexes 243969-69-9DP, tetrakis(pivalamidophenyl)porphyrinatocobalt complexes
 (O-permeable membranes contg. arom. vinylamine polymer-tetrakis(pivalamidophenyl)porphyrinatocobalt complexes for prodn. of O-enriched air)

L24 ANSWER 17 OF 42 HCA COPYRIGHT 2004 ACS on STN

130:82614 Manufacture of anion exchanger resins bearing quaternary ammonium groups. Hirayama, Hiroki; Todoroki, Tomonari (Tokuyama K. K., Japan). Jpn. Kokai Tokkyo Koho JP 10324715 A2 19981208 Heisei, 5 pp. (Japanese). CODEN: JKXXAF. APPLICATION: JP 1997-134590 19970526.

AB The resins are manufd. by quaternizing tertiary amino group-contg. resins by 100 parts alkyl halides in the presence of 0.5-10.0 parts alcs. Thus, a PVC fabric was impregnated with a soln. comprising 4-vinylpyridine 70, styrene 15, divinylbenzene 15, poly(vinyl chloride) fine powder 30, and benzoyl peroxide 5 parts, covered with a polyester release film, and heated at 80° to give a polymer membrane, which was quaternized by 100 parts MeI in the presence of 1 part MeOH at 30° for 10 h to give an anion exchanger showing ion exchange capacity 2.7 mmol/g, quaternization degree 0.98, and elec. resistivity 1.8 Ω-cm².

IT 218771-75-6P
 (manuf. of anion exchanger resins bearing quaternary ammonium groups)

RN 218771-75-6 HCA

CN 2-Propenoic acid, 2-methyl-, butyl ester, polymer with diethenylbenzene and 2-ethenyl-1H-imidazole, compd. with 1-bromobutane (9CI) (CA INDEX NAME)

CM 1

CRN 109-65-9

CMF C4 H9 Br

Br—CH₂—CH₂—CH₂—CH₃

CM 2

CRN 218771-74-5

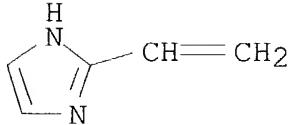
CMF (C₁₀ H₁₀ . C₈ H₁₄ O₂ . C₅ H₆ N₂)_x

CCI PMS

CM 3

CRN 43129-93-7

CMF C₅ H₆ N₂

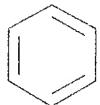


CM 4

CRN 1321-74-0

CMF C₁₀ H₁₀

CCI IDS

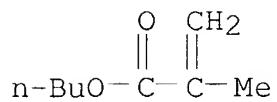


2 [D₁—CH=CH₂]

CM 5

CRN 97-88-1

CMF C₈ H₁₄ O₂



IC ICM C08F008-44

ICS B01J041-12; B01J047-12; C08J005-22; C08F026-00

CC 38-3 (Plastics Fabrication and Uses)

IT 64422-43-1P 218771-75-6P 218771-76-7P

(manuf. of anion exchanger resins bearing quaternary ammonium groups)